24/9/8
DIALOG(R)File 155:MEDLINE(R)

13801699 PMID: 9500276

Three-dimensional monitoring of small temperature changes for therapeutic hyperthermia using MR.

Wlodarczyk W; Boroschewski R; Hentschel M; Wust P; Monich G; Felix R

Department of Electrical Engineering, Technical University, Berlin, Germany.

Journal of magnetic resonance imaging - JMRI (UNITED STATES) Jan-Feb 1998, 8 (1) p165-74, ISSN 1053-1807 Journal Code: 9105850

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: Completed

Subfile: INDEX MEDICUS

Radiofrequency hyperthermia of deep-seated pelvic tumors requires noninvasive monitoring of temperature distributions in patients. Methods of MR thermography were reported to be a promising tool in solving this problem. However, to be truly useful for monitoring hyperthermia treatments, MR thermography should be able to cover the entire pelvis in acquisition times no longer than for a breath-hold (< or = 15 seconds) and to resolve small temperature differences (< 1 degrees C). Three methods exploiting the temperature dependence of spin-lattice relaxation time (T1), of self-diffusion coefficient (D), and of chemical shift of proton resonance frequency (PRF) were applied in phantom experiments; the pulse sequences were the T1-weighted gradient echo, the pulsed diffusion gradient spin echo made faster through the keyhole technique, and the gradient echo with the phase reconstruction, respectively. The **high planar resolution** was compromised, and instead, coarse and more **isotropic voxels** were used. Experiments were performed in two consecutive steps, thus imitating a possible scenario for monitoring hyperthermia. In the first step, calibration curves were recorded, which were then used in the second step to obtain maps of temperature changes. The results show a clear superiority of the PRF method, followed by the D and the T1 methods. The uncertainty of temperature changes predicted both from calibration curves and from maps was less than 1 degrees C only with the PRF and the D-based methods.

Tags: Human; Support, Non-U.S. Gov't

Descriptors: Hyperthermia, Induced; *Magnetic Resonance **Imaging** --methods--MT; Calibration; Contrast Media; Gadolinium DTPA; **Image** Processing, Computer-Assisted; Magnetic Resonance Spectroscopy--diagnostic

NA TAF
3/12/2004

24/9/9
DIALOG(R)File 155:MEDLINE(R)

13554141 PMID: 10168885
The quality of trabecular bone evaluated with micro-computed tomography, FEA and mechanical testing.
Ulrich D; Hildebrand T; Van Rietbergen B; Muller R; Ruegsegger P
Institute for Biomedical Engineering, University of Zurich, Switzerland.
Studies in health technology and informatics (NETHERLANDS) 1997, 40 p97-112, ISSN 0926-9630 Journal Code: 9214582
Document type: Journal Article; Review; Review, Tutorial
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: HEALTH TECHNOLOGY ASSESSMENT
Most standard methods to predict bone quality are merely based on apparent density measurements. However, apparent density alone does neither explain all variation of the mechanical properties nor does it account for the structural anisotropy of trabecular bone. Thus, apparent density alone might not be sufficient to accurately predict the quality of bone. This study investigates if a new approach based on microstructural computer models can provide additional and relevant information on bone quality. 58 human trabecular bone samples from the femoral head were measured with a 3-D micro-Computed Tomography (micro-CT) system providing a **voxel** representation of the bone microarchitecture with a **resolution** of 28 microns. Based on such representations, the orthotropic stiffness matrices and the principal **directions** were computed for 5 mm cubes with microstructural Finite Element Analysis (FEA). For a subset of six samples the moduli were then validated with tri-axial mechanical compression tests. The results show that on average 15% of the variation of the elastic properties are not explained by bone volume fraction. Differences of elastic properties between samples with the same bone volume fraction range up to 53%. The variation of the degree of anisotropy is unrelated to that of the bone volume fraction. Finally, the **direction** -dependent stiffness of the trabecular bone differs by a factor of four, indicating that one single (**isotropic**) modulus as predicted from apparent density measurements might not be adequat. It is concluded that micro-CT-based FEA provides new and additional information about anisotropy and mechanical properties in a direct and non-destructive way, and thus will be important in the future for advanced failure risk prediction. An extension to patient examinations using **high-resolution** CT or MRI techniques is envisaged. (43 Refs.)
Tags: Human; Support, Non-U.S. Gov't

MA TAF
5/13/2004

24/9/10
DIALOG(R)File 155:MEDLINE(R)

13189088 PMID: 8858769
Gadolinium-enhanced three-dimensional MR angiography of the thoracoabdominal aorta.
Krinsky G; Weinreb J
Department of Radiology, New York University Medical Center, NY 10016, USA.
Seminars in ultrasound, CT, and MR (UNITED STATES) Aug 1996, 17 (4) p280-303, ISSN 0887-2171 Journal Code: 8504689
Document type: Journal Article; Review; Review, Tutorial
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS
MR angiography (MRA) of the thoracoabdominal aorta is a noninvasive technique that can rapidly acquire a volume of data with the capability of multiplaner reformations (MPR) and "bright blood" maximum intensity projection (MIP) angiographic **images**. These MIP **images** can display long tortuous vessels in a single three-dimensional (3D) volume, with excellent delineation of branch vessel diseases and without the flow artifacts or long examination times of conventional spin-echo (SE) **imaging**. Two-dimensional (2D) time-of-flight (TOF) **imaging** is used most widely because of familiarity and ease of implementation, but this method has limitations in evaluating thoracoabdominal aortic disease. Sequential 2D axial **imaging** (which maximizes flow-related enhancement) is time consuming, subject to **slice**-to-**slice** misregistration, and can be degraded by pulsatile and turbulent flow. Coronal or parasagittal **imaging** is more time efficient, but **image** degradation secondary to in plane saturation and stagnant or turbulent flow from aneurysmal disease may lead to nondiagnostic studies. Three-dimensional TOF techniques offer the advantages of higher signal-to-noise ratio, better spatial **resolution** with near **isotropic voxels** , and shorter echo times (TEs), which lessen signal loss because of intravoxel phase dispersion. Although these techniques provide excellent **image** quality in the carotid arteries, they are of limited use in the aorta because of saturation effects. However, the addition of gadolinium chelates shortens the T1 relaxation rate of blood, which obviates the need for flow-related enhancement, allowing for inplane **imaging** without saturation effects, even in regions of virtually stagnant flow. The enormous signal enhancement of gadolinium chelates enables **imaging** with **high-resolution** matrices, providing diagnostic angiograms in as little as 2 minutes. With improved hardware, faster and stronger gradients, and phased-array coils that increase the signal-to-noise ratio, breath-hold gadolinium-enhanced 3D schemes with ultrashort TEs will become the optimal method for **imaging** the aorta and its branch vessels. Using this technique, the aorta can be **imaged** in less than 1 minute. (19 Refs.)
Tags: Human

NA TAF
5/13/2004

13may04 07:40:58 User259284 Session D2749.3

Additional STIC Search of Non Patent Articles May 13th 2004 Ex TMF See attached Search History, Data Base & Results

File 155:MEDLINE(R) 1966-2004/May W2
(c) format only 2004 The Dialog Corp.

Set	Items	Description
S1	16700	'IMAGE ENHANCEMENT' OR 'RADIOGRAPHIC IMAGE ENHANCEMENT'
S2	511088	R1:R16 OR IMAGE?? OR IMAGING
S3	582	S1:S2 AND ISOTROPIC???????
S4	97	S3 AND VOXEL??????
S5	57	S4 AND RESOLUTION??
S6	6	S4 AND (DIFFERENT???? OR DIRECTION?? OR MULTI OR MULTIPLE - OR PLANE?? OR PLANAR?????)(3N)RESOLUTION??
S7	38	HILLCLIMB? OR HILL()CLIMB?????
S8	23601	(INCREAS???? OR CLIMB???? OR RISING)(2N)SLOPE?? OR STEPWISE OR STEP()WISE
S9	28	S3 AND ORTHOG???????
S10	64	S3 AND CORRELAT?????????
S11	95	S3 AND SCANN??????
S12	75	S3 AND (SLAB???? OR SLICE????)
S13	87	S3 AND DIRECTION?????
S14	3	S3 AND (MATRIX????? OR MATRICES OR ARRAY????)(4N)VOXEL????-??
S15	1	S3 AND (MATRIX????? OR MATRICES OR ARRAY????) AND VOLUM???-??(W)ELEMENT??
S16	7	S3 AND SLAB???????
S17	0	S3 AND (FIRST OR SECOND OR THIRD OR ANOTHER)(W)DIRECTION???
S18	80	S4 AND S5:S16
S19	17	S6 OR S14:S16
S20	62	S18:S19 AND RESOL?????????
S21	30	S18:S19 AND (HIGH????? OR ENHANC?????? OR IMPROV?????)(3N)-RESOL?????????
S22	7	S1 AND S21
S23	23	S21 NOT S22
S24	23	S23/ENG
S25	65	ISOTROP??????(3N)(VOXEL??? OR VOLUM????) AND (VOXEL?????? - OR VOLUME()ELEMENT????)
S26	609	(VOXEL??? OR VOLUM????)(5N)(ARRAY???? OR MATRIX??? OR MATR-ICES)
S27	56	(VOXEL??? OR VOLUM????)(5N)GRID??????
S28	4	S25 AND S26:S27
S29	4	S28 NOT S21

13may04 07:53:04 User259284 Session D2749.4

File 2:INSPEC 1969-2004/May W1

Set	Items	Description
S1	593135	R1:R15 OR R19 OR IMAGE?? OR IMAGING
S2	2	S1 AND HILLCLIMB?
S3	58	S1 AND HILL()CLIMB?
S4	10387	(INCREAS???? OR CLIMB???? OR RISING)(2N)SLOPE?? OR STEPWISE OR STEP()WISE
S5	741	S1 AND S4
S6	34677	S1 AND CORRELAT?????
S7	3246	S1 AND ISOTROP????????
S8	2636	S1 AND (VOXEL?????? OR VOLUME????(W)ELEMENT??)
S9	707	S1 AND (VOXEL?????? OR VOLUME????)(6N)(ARRAY???? OR MATRIX-?????? OR GRID?????? OR PATTERN???)
S10	174	8AND9
S11	9	7AND10
S12	0	S2:S3 AND S7

S13	0	(S2:S4 OR HILL OR CLIMB????) AND S7 AND S9
S14	3	(S2:S4 OR HILL OR CLIMB????) AND S9
S15	6	(S2:S4 OR HILL OR CLIMB????) AND S8
S16	254	(S2:S6 OR HILL OR CLIMB????) AND S7
S17	223	(S2:S6 OR HILL OR CLIMB????) AND S8
S18	41	(S2:S6 OR HILL OR CLIMB????) AND S9
S19	13	S16:S18 AND ORTHOG?????
S20	48	S16:S18 AND (DIRECTION????? OR MULTIDIRECTION??)
S21	58	S16:S18 AND (PLANE?? OR PLANAR??????)
S22	88	S16:S18 AND SCANN???????
S23	32	S16:S18 AND (SLAB???? OR SLIC????)
S24	88	S16:S18 AND RESOL?????????
S25	45	S16:S18 AND CONTRAST????????
S26	46	S24 AND (S18:S23 OR S25)
S27	1	S26 AND ISOTROP???????(6N)VOXEL???????
S28	10	S26 AND ISOTROP???????/TI,DE,ID
S29	0	S3 AND ISOTROP????????
S30	0	S3 AND RESOL??????? AND VOXEL???????
S31	39	S2 OR S11:S15 OR S19 OR S27:S28
S32	5	S7 AND VOXEL?????? AND CORRELAT??????
S33	40	S31:S32
S34	13	S33/2001-2004
S35	35	S33 NOT S32
S36	27	S33 NOT S34

13may04 08:21:34 User259284 Session D2749.9

SYSTEM:OS - DIALOG OneSearch
File 34:SciSearch(R) Cited Ref Sci 1990-2004/May W1
(c) 2004 Inst for Sci Info
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
(c) 1998 Inst for Sci Info

Set	Items	Description
S1	36	CR=MATEJ S, 1994?
S2	24	CR=MATEJ S, 1995?
S3	0	S1:S2 AND ISOTROP????????
S4	11	CR=MATEJ? AND ISOTROP????????
S5	0	CR=HENSON SS?
S6	121	CR=HENSON MM?
S7	14	CR=MELLIN AF?
S8	1	6AND7
S9	2	S6:S7 AND ISOTROP?????????
S10	42	CR=WILSON JL, 1993?
S11	46	CR=WILSON JL, 1996?
S12	2	S10:S11 AND ISOTROP?????????

13may04 07:39:30 User259284 Session D2749.2

SYSTEM:OS - DIALOG OneSearch
File 34:SciSearch(R) Cited Ref Sci 1990-2004/May W1
(c) 2004 Inst for Sci Info
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
(c) 1998 Inst for Sci Info

Set	Items	Description

? e cr=higashi m, 1998

Ref	Items	Index-term
E1	1	CR=HIGASHI M, 1997, V57, P319, NIPPON ACTA RADIOL
E2	2	CR=HIGASHI M, 1997, V57, P319, NIPPON IGAKU HOSHA
E3	0	*CR=HIGASHI M, 1998
E4	3	CR=HIGASHI M, 1998, P79, TANSO
E5	1	CR=HIGASHI M, 1998, V161, P79, TANSO
E6	1	CR=HIGASHI M, 1998, V18, P79, TANSO
E7	1	CR=HIGASHI M, 1998, V27, P15, PLANT GROWTH REGUL
E8	1	CR=HIGASHI M, 1999, V1402, P523, NATURE
E9	23	CR=HIGASHI M, 1999, V30, P1347, HEPATOLOGY
E10	1	CR=HIGASHI M, 1999, V402, P1523, NATURE
E11	71	CR=HIGASHI M, 1999, V402, P523, NATURE
E12	4	CR=HIGASHI M, 1999, V49, P453, PATHOL INT

9/9/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

04810121 Genuine Article#: UJ075 Number of References: 18
Title: RECONSTRUCTIONS AND CROSS-SECTIONAL AREA MEASUREMENTS FROM MAGNETIC-RESONANCE MICROSCOPIC IMAGES OF THE COCHLEA
Author(s): WILSON JL; HENSON MM; GEWALT SL; KEATING AW; HENSON OW
Corporate Source: UNIV N CAROLINA,DIV OTOLARYNGOL HEAD & NECK SURG,CB 7090,TAYLOR HALL/CHAPEL HILL//NC/27599; UNIV N CAROLINA,DIV OTOLARYNGOL HEAD & NECK SURG/CHAPEL HILL//NC/27599; DUKE UNIV,MED CTR,DEPT RADIOL,CTR IN VIVO MICROSCOPY/DURHAM//NC/00000; UNIV N CAROLINA,DEPT CELL BIOL & ANAT/CHAPEL HILL//NC/00000
Journal: AMERICAN JOURNAL OF OTOLOGY, 1996, V17, N2 (MAR), P347-353
ISSN: 0192-9763
Language: ENGLISH Document Type: ARTICLE
Geographic Location: USA
Subfile: SciSearch; CC CLIN--Current Contents, Clinical Medicine
Journal Subject Category: OTORHINOLARYNGOLOGY
Abstract: In this study, magnetic resonance (MR) microscopy was used to obtain serial sections through the cochleae of mustached bats. As previously reported, 25-mu m ***isotropic*** voxels can be obtained. Specific areas in each slice were segmented and then three-dimensional (3-D) reconstructions of the perilymphatic and endolymphatic spaces and spiral ligament were obtained. Quantitative measurements the cross-sectional areas were made with customized macros written for the public-domain software, NIH Image. Results of this study revealed enlargements of the scalae and spiral ligament in areas known to be involved with processing of the animal's biosonar and fine-frequency analysis.
Cited References:
BANSON ML, 1992, V27, P157, INVEST RADIOL
HENSON MM, 1991, V56, P122, HEARING RES
HENSON MM, 1994, V75, P75, HEARING RES

12/9/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

08078864 Genuine Article#: 244KL Number of References: 13
Title: Cochlear fluid space dimensions for six species derived from reconstructions of three-dimensional magnetic resonance images
Author(s): Thorne M; Salt AN (REPRINT) ; DeMott JE; Henson MM; Henson OW; Gewalt SL
Corporate Source: WASHINGTON UNIV,SCH MED, DEPT OTOLARYNGOL, BOX 8115, 517 S EUCLID AVE/ST LOUIS//MO/63110 (REPRINT); WASHINGTON UNIV,SCH MED, DEPT OTOLARYNGOL/ST LOUIS//MO/63110; UNIV N CAROLINA,DIV OTOLARYNGOL HEAD & NECK SURG/CHAPEL HILL//NC/; UNIV N CAROLINA,DEPT CELL BIOL & ANAT/CHAPEL HILL//NC/; DUKE UNIV,MED CTR, DEPT RADIOL, CTR VIVO MICROSCOPY/DURHAM//NC/27710
Journal: LARYNGOSCOPE, 1999, V109, N10 (OCT), P1661-1668
ISSN: 0023-852X Publication date: 19991000
Publisher: LIPPINCOTT WILLIAMS & WILKINS, 227 EAST WASHINGTON SQ, PHILADELPHIA, PA 19106
Language: English Document Type: ARTICLE
Geographic Location: USA
Subfile: CC CLIN--Current Contents, Clinical Medicine;
Journal Subject Category: OTORHINOLARYNGOLOGY; MEDICINE, RESEARCH & EXPERIMENTAL
Abstract: Objectives: To establish the dimensions and volumes of the cochlear fluid spaces. Study Design: Fluid space volumes, lengths, and cross-sectional areas mere derived for the cochleas from six species: human, guinea pig, bat, rat, mouse, and gerbil. Methods: Three-dimensional reconstructions of the fluid spaces were made from magnetic resonance microscopy (MRM) images. Consecutive serial slices composed of **isotropic** voxels (25 mu m(3)) representing the entire volume of fixed, isolated cochleas were obtained. The boundaries delineating the fluid spaces, including Reissner's membrane, were resolved for all specimens, except for the human, in which Reissner's membrane was not consistently resolved. Three-dimensional reconstructions of the endolymphatic and perilymphatic fluid spaces were generated. Fluid space length and variation of cross-sectional area with distance were derived by an algorithm that followed the midpoint of the space along the length of the spiral. The total volume of each fluid space was derived from a voxel count for each specimen. Results: Length, volume, and cross-sectional areas are provided for six species, Ln all cases, the length of the endolymphatic fluid space was consistently longer than that of either perilymphatic scala, primarily as a result of a greater radius of curvature, For guinea pig specimens, the measured volumes of the fluid spaces were considerably lower than those suggested by previous reports based on histological data. Conclusions: The quantification of cochlear fluid spaces provided by this study will enable the more accurate calculation of drug and other solute movements in fluids of the inner ear during experimental or clinical manipulations.
Descriptors--Author Keywords: cochlea ; end
Cited References:
WILSON JL, 1996, V17, P347, AM J OTOL
ZRUNEK M, 1980, V229, P159, ARCH OTORHINOLARYNGO

22/9/4
DIALOG(R)File 155:MEDLINE(R)

12998224 PMID: 8661285

Microstructural and physiological features of tissues elucidated by quantitative-diffusion-tensor MRI.

Basser P J; Pierpaoli C

Biomedical Engineering and Instrumentation Program, NCRR, NINDS, Bethesda, Maryland 20892-5766, USA.

Journal of magnetic resonance. Series B (UNITED STATES) Jun 1996, 111 (3) p209-19, ISSN 1064-1866 Journal Code: 9309764

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: Completed

Subfile: INDEX MEDICUS

NA TAF
5/13/2004

Quantitative-diffusion-tensor MRI consists of deriving and displaying parameters that resemble histological or physiological stains, i.e., that characterize intrinsic features of tissue microstructure and microdynamics. Specifically, these parameters are objective, and insensitive to the choice of laboratory coordinate system. Here, these two properties are used to derive intravoxel measures of diffusion isotropy and the degree of diffusion anisotropy, as well as intervoxel measures of structural similarity, and fiber-tract organization from the effective diffusion tensor, D, which is estimated in each **voxel**. First, D is decomposed into its **isotropic** and anisotropic parts, [D] I and D - [D] I, respectively (where [D] = Trace(D)/3 is the mean diffusivity, and I is the identity tensor). Then, the tensor (dot) product operator is used to generate a family of new rotationally and translationally invariant quantities. Finally, maps of these quantitative parameters are produced from **high-resolution** diffusion tensor **images** (in which D is estimated in each **voxel** from a series of 2D-FT spin-echo diffusion-weighted **images**) in living cat brain. Due to the high inherent sensitivity of these parameters to changes in tissue architecture (i.e., macromolecular, cellular, tissue, and organ structure) and in its physiologic state, their potential applications include monitoring structural changes in development, aging, and disease.

22/9/7
DIALOG(R)File 155:MEDLINE(R)

10168895 PMID: 8057814

Studies on bromobenzene-induced hepatotoxicity using in vivo MR microscopy with surgically implanted RF coils.

Zhou X; Maronpot R R; Cofer G P; Hedlund L W; Johnson G A

Department of Radiology, Duke University Medical Center, Durham, North Carolina 27710.

Magnetic resonance in medicine - official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine (UNITED STATES) Jun 1994, 31 (6) p619-27, ISSN 0740-3194
Journal Code: 8505245

Contract/Grant No.: P41-RR-05959-02; RR; NCRR; R01-ES04187-04A1; ES; NIEHS

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: Completed

Subfile: INDEX MEDICUS

Using surgically implanted RF coils at 300 MHz, three-dimensional microscopic MR **images** of rat liver were obtained in vivo to follow the development of pathology induced by bromobenzene exposure. Formalin fixed specimens of liver from these animals were also **imaged** using in vitro MR microscopy, followed by conventional optical microscopy. All MR **images** were acquired using a spin-warp pulse sequence with TR = 950 ms and TE = 23 ms. The in vivo **images** were reconstructed as 256(2) x 32 **arrays** with a **voxel** size of (50 microns)2 x 219 microns, while the in vitro **images** were reconstructed as 256(2) x 128 arrays, giving an **isotropic resolution** at (39 microns)3. Based on results from six animals, we have found in all animals exposed to bromobenzene, **image** intensity decreased in specific hepatic tissue regions. These regions were well **correlated** to low signal intensity areas observed in in vitro MR **images** at **higher resolution** . Conventional optical microscopy indicated that the low signal intensity regions corresponded to areas of necrosis. The decrease in signal intensity is consistent with increased local diffusion coefficients as a result of necrosis. This study demonstrates that MR microscopy with implanted RF coils can be successfully used to follow tissue pathological changes in living tissues.

Tags: Female; Support, U.S. Gov't, P.H.S.

NA TAF
5/13/2004

09/540,524

Received
From STIC
May 13th 2004
TAR

29/9/3
DIALOG(R)File 155:MEDLINE(R)

10183873 PMID: 8071156
Imaging the cochlea by magnetic resonance microscopy.
Henson M M; Henson O W; Gewalt S L; Wilson J L; Johnson G A
Division of Otolaryngology/Head and Neck Surgery, University of North Carolina, Chapel Hill 27599.
Hearing research (NETHERLANDS) May 1994, 75 (1-2) p75-80, ISSN 0378-5955 Journal Code: 7900445
Contract/Grant No.: NIDCD 1P41RR05959; RR; NCRR; NIDCD DC00114; DC; NIDCD
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS
The isolated, fixed cochlea of the mustached bat was studied with three dimensional magnetic resonance (MR) microscopy. The cochlea of this animal is about 4 mm in diameter and its entire volume was imaged. With the field of view and **matrix** size used, the **volume elements** (**voxels**) making up the **volume** data set were **isotropic** 25 x 25 x 25 micron cubes. Three dimensional (3D) MR microscopy based on **isotropic voxels** has many advantages over commonly used light microscopy: 1) it is non destructive; 2) it is much less time consuming; 3) no dehydration is required and shrinkage is minimized; 4) the data set can be used to create sections in any desired plane; 5) the proper alignment of sections is inherent in the 3D acquisition so that no reference points are required; 6) the entire data set can be viewed from any point of view in a volume rendered image; 7) the data is digital and features can be enhanced by computer image processing; and 8) the **isotropic** dimensions of the **voxels** make the data well-suited for structural reconstructions and measurements. Good images of the osseous spiral lamina, spiral ligament, scala tympani, scala vestibuli, and nerve bundles were obtained. The vestibular (Reissner's) membrane was easily identified in the mustached bat and it appears to bulge into the scala vestibuli. The visibility of this structure suggests that MR microscopy would be well-suited for studies of endolymphatic hydrops.
Tags: Support, Non-U.S. Gov't; Support, U.S. Gov't, P.H.S.
Descriptors: *Cochlea--anatomy and histology--AH; *Magnetic Resonance

36/9/17
DIALOG(R)File 2:INSPEC

Requested From STIC May 15th 2004

4815360 INSPEC Abstract Number: A9424-8780-029
Title: Three dimensional magnetic resonance microangiography of rat neurovasculature
Author(s): Mellin, A.F.; Cofer, G.P.; Smith, B.R.; Suddarth, S.A.; Hedlund, L.W.; Allan Johnson, G.
Author Affiliation: Dept. of Radiol., Duke Univ. Med. Center, Durham, NC, USA
Journal: Magnetic Resonance in Medicine vol.32, no.2 p.199-205
Publication Date: Aug. 1994 Country of Publication: USA
CODEN: MRMEEN ISSN: 0740-3194
U.S. Copyright Clearance Center Code: 0740-3194/94/$3.00
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
Abstract: Techniques are described to perform three dimensional (3D) MR microangiography. The authors have combined the use of a blood pool agent (Gd-DTPA-complexed with bovine serum albumin), three dimensional Fourier encoding, careful animal stabilization, and volume rendering to permit **imaging** with **voxels** of 60*60*60 mu m. 3DFT encoding has been performed at 7.1 T with very large **arrays** (256*512*512). Interactive **volume** rendering allows a number of unique display opportunities that effectively exploit these **isotropic** 3D arrays. (37 Refs)
Subfile: A
Descriptors: biological NMR; biological techniques and instruments; neurophysiology
Identifiers: 3D magnetic resonance microangiography; rat neurovasculature ; blood pool agent; Gd-DTPA-complex; bovine serum albumin; 3D Fourier encoding; animal stabilization; volume rendering; display opportunities; **isotropic** 3D arrays; **voxels**; 7.1 T; Gd
Class Codes: A8780 (Biophysical instrumentation and techniques); A8740

24/9/6
DIALOG(R)File 155:MEDLINE(R)

14473400 PMID: 10472972

Comparison of three-dimensional visualization techniques for depicting the scala vestibuli and scala tympani of the cochlea by using **high-resolution** MR **imaging**.

Hans P; Grant A J; Laitt R D; Ramsden R T; Kassner A; Jackson A
Department of Diagnostic Radiology, Stopford Medical School, Manchester, UK.

AJNR. American journal of neuroradiology (UNITED STATES) Aug 1999, 20 (7) p1197-206, ISSN 0195-6108 Journal Code: 8003708
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS

BACKGROUND AND PURPOSE: Cochlear implantation requires introduction of a stimulating electrode array into the scala vestibuli or scala tympani. Although these structures can be separately identified on many **high-resolution** scans, it is often difficult to ascertain whether these channels are patent throughout their length. The aim of this study was to determine whether an optimized combination of an **imaging** protocol and a visualization technique allows routine 3D rendering of the scala vestibuli and scala tympani. METHODS: A submillimeter T2 fast spin-echo **imaging** sequence was designed to optimize the performance of 3D visualization methods. The spatial **resolution** was determined experimentally using primary **images** and 3D surface and volume renderings from eight healthy subjects. These data were used to develop the **imaging** sequence and to compare the quality and signal-to-noise dependency of four data visualization algorithms: maximum intensity projection, ray casting with transparent **voxels**, ray casting with opaque **voxels**, and isosurface rendering. The ability of these methods to produce 3D renderings of the scala tympani and scala vestibuli was also examined. The **imaging** technique was used in five patients with sensorineural deafness. RESULTS: Visualization techniques produced optimal results in combination with an **isotropic** volume **imaging** sequence. Clinicians preferred the isosurface-rendered **images** to other 3D visualizations. Both isosurface and ray casting displayed the scala vestibuli and scala tympani throughout their length. Abnormalities were shown in three patients, and in one of these, a focal occlusion of the scala tympani was confirmed at surgery. CONCLUSION: Three-dimensional **images** of the scala vestibuli and scala tympani can be routinely produced. The combination of an MR sequence optimized for use with isosurface rendering or ray-casting algorithms can produce 3D **images** with greater spatial **resolution** and anatomic detail than has been possible previously.

Tags: Comparative Study; Female; Human; Male; Support, Non-U.S. Gov't

24/9/7

13871707 PMID: 9572523

High-resolution 3D Bayesian **image** reconstruction using the microPET small-animal **scanner.**

Qi J; Leahy R M; Cherry S R; Chatziioannou A; Farquhar T H
Signal and Image Processing Institute, University of Southern California, Los Angeles 90089-2564, USA.

Physics in medicine and biology (ENGLAND) Apr 1998, 43 (4) p1001-13, ISSN 0031-9155 Journal Code: 0401220
Contract/Grant No.: R01 CA579794; CA; NCI; R01 CA69370; CA; NCI
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS

A Bayesian method is described for reconstruction of **high-resolution** 3D **images** from the microPET small-animal **scanner. Resolution** recovery is achieved by explicitly modelling the depth dependent geometric sensitivity for each **voxel** in combination with an accurate detector response model that includes factors due to photon pair non-collinearity and inter-crystal scatter and penetration. To reduce storage and computational costs we use a factored matrix in which the detector response is modelled using a sinogram blurring kernel. Maximum a posteriori (MAP) **images** are reconstructed using this model in combination with a Poisson likelihood function and a Gibbs prior on the **image.** Reconstructions obtained from point source data using the accurate system model demonstrate a potential for near-**isotropic** FWHM **resolution** of approximately 1.2 mm at the center of the field of view compared with approximately 2 mm when using an analytic 3D reprojection (3DRP) method with a ramp filter. These results also show the ability of the accurate system model to compensate for **resolution** loss due to crystal penetration producing nearly constant radial FWHM **resolution** of 1 mm out to a 4 mm radius. Studies with a point source in a uniform cylinder indicate that as the **resolution** of the **image** is reduced to control noise propagation the **resolution** obtained using the accurate system model is superior to that obtained using 3DRP at matched background noise levels. Additional studies using pie phantoms with hot and cold cylinders of diameter 1-2.5 mm and 18FDG animal studies appear to confirm this observation.

Tags: Support, U.S. Gov't, P.H.S.
Descriptors: **Image** Processing, Computer-Assisted--methods--MT; *Phantoms, **Imaging;** ***Tomography,** Emission-Computed

24/9/11
DIALOG(R)File 155:MEDLINE(R)

12745494 PMID: 7666955
Acute subarachnoid haemorrhage: 3D time-of-flight MR angiography versus intra-arterial digital angiography.
Anzalone N; Triulzi F; Scotti G
Department of Neuroradiology, Scientific Institute H.S. Raffaele, Milan, Italy.
Neuroradiology (GERMANY) May 1995, 37 (4) p257-61, ISSN 0028-3940 Journal Code: 1302751
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS
To evaluate the efficacy and reliability of 3D time-of-flight MR angiography (TOF MRA) as a noninvasive procedure, 27 patients with acute subarachnoid haemorrhage (SAH) were studied with MRA immediately before or after intra-arterial digital subtraction angiography (DSA).3DTOF MRA was performed with an axial **slab** of 60 mm centered on the circle of Willis and **isotropic voxels** . DSA showed 22 aneurysms and 1 dural arteriovenous fistula in 21 patients; the aneurysms ranged in size from 2 to 8mm. MRA failed to show 2 small aneurysms, at the origin of the posterior and anterior communicating arteries. The 3D display of the intracranial vessels obtained with maximum intensity projection (MIP) or targetted MIP sometimes rendered the aneurysms better than DSA. However, due to its **high** spatial **resolution**, DSA more clearly defined the overall anatomy of the walls of the normal and abnormal vessels.
Tags: Comparative Study; Female; Human; Male

11903648 PMID: 12100319

Three-dimensional MR visualization of the intracisternal course of the cranial nerves V-VIII by virtual cisternoscopy.

Heine C; Klingebiel R; Lehmann R

Neuroradiology Section, Department of Radiology, Charite Campus Mitte, Humboldt University, Berlin, Germany.

Acta radiologica (Stockholm, Sweden - 1987) (Denmark) May 2002, 43 (3) p242-8, ISSN 0284-1851 Journal Code: 8706123

Erratum in Acta Radiol. 2002 Nov;43(6) 632.

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: Completed

Subfile: INDEX MEDICUS

PURPOSE: A post-processing protocol for 3D visualization of the cranial nerves V-VIII along their intracisternal course is presented. MATERIAL AND METHODS: Six healthy volunteers underwent MR **imaging** (1.5 T) to obtain **high-resolution** heavily T2-weighted data sets (3DFT CISS) with **isotropic voxels** (0.5 mm3). The data sets were post-processed by using volume rendering software in order to visualize the intracisternal courses of the cranial nerves V-VIII as well as their root entry zones. The data acquisition and post-processing protocol was then applied in 14 patients with a suspected neural compression syndrome according to the clinical findings as well as cross-sectional **images** and evaluated with respect to **image** quality and diagnostic value by two neuroradiologists, using a five-point scale. RESULTS: Virtual cisternoscopy allowed a comprehensive intracisternal 3D visualization of the affected cranial nerves in 12/14 patients. The mean post-processing time amounted to 13.1/5.6/13.7 min for the cranial nerves V/VI/VII and VIII. The mean score for **image** quality was 4.2, that for diagnostic value 4.1. 2D and/or 3D reference **images** were indispensable for appreciating the spatial information provided by virtual cisternoscopy. CONCLUSION: The data acquisition and post-processing protocol presented here allows comprehensive and standardized intracisternal 3D visualization of the cranial nerves V-VIII in a routine setting as a complementary **imaging** procedure.

24/9/23
DIALOG(R)File 155:MEDLINE(R)

10475295 PMID: 10571932
Theoretical limits of spatial **resolution** in elliptical-centric contrast-enhanced 3D-MRA.
Fain S B; Riederer S J; Bernstein M A; Huston J
Magnetic Resonance Laboratory, Mayo Clinic, Rochester, MN 55905, USA.
Magnetic resonance in medicine - official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine (UNITED STATES) Dec 1999, 42 (6) p1106-16, ISSN 0740-3194
Journal Code: 8505245
Contract/Grant No.: CA37993; CA; NCI; HL37310; HL; NHLBI
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS
The point spread function (PSF) for contrast-enhanced three-dimensional (3D) MR angiography using the elliptical centric view order is derived. This view order has been shown previously to provide high venous suppression thereby enabling long acquisition times capable of **high** spatial **resolution** . The dependence of the PSF on TR, field of view (FOV), scan time, and trigger time are shown explicitly. Theoretical predictions are corroborated with experimental results in phantoms and in vivo. The PSF width decreases as the square root of the product of TR and the two phase encoding FOV's for fixed nominal **voxel** size. The PSF peak amplitude increases as the reciprocal of this product. Theory and experiment demonstrate that acquisition times over 40 sec provide superior **resolution** compared to shorter acquisitions, despite falling levels of contrast agent concentration. The analysis predicts that an **isotropic** spatial **resolution** of 1 mm before zero filling is possible in a FOV large enough to encompass the carotid and vertebral arteries bilaterally. Magn Reson Med 42:1106-1116, 1999. Copyright 1999 Wiley-Liss, Inc.
Tags: Human; Support, Non-U.S. Gov't; Support, U.S. Gov't, P.H.S.

29/9/1
DIALOG(R)File 155:MEDLINE(R)

14334048 PMID: 10320516

Effect of prostaglandin and bisphosphonate on cancellous bone volume and structure in the ovariectomized rat studied by quantitative three-dimensional nuclear magnetic resonance microscopy.

Takahashi M; Wehrli F W; Wehrli S L; Hwang S N; Lundy M W; Hartke J; Borah B

Department of Radiology, University of Pennsylvania Medical Center, Philadelphia, Pennsylvania 19104, USA.

Journal of bone and mineral research - the official journal of the American Society for Bone and Mineral Research (UNITED STATES) May 1999, 14 (5) p680-9, ISSN 0884-0431 Journal Code: 8610640

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: Completed

Subfile: INDEX MEDICUS

The purpose of this work was to evaluate the potential of nuclear magnetic resonance microscopy (NMRM) in conjunction with a processing technique to monitor the effect of preventive agents in an ovariectomized (OVX) rat. Twenty-five female Sprague-Dawley rats were OVX at 6 months of age (except for the intact control group), allowed to lose bone for 60 days, and then treated for 60 days. During treatment, animals were administered vehicle, prostaglandin E2 (PGE2; 6 mg/kg), or alendronate (3 microg/kg) subcutaneously once a day. Subsequently, tibiae were harvested and the marrow removed. NMRM was carried out at 9.4 T, with the specimens immersed in 1.2 mM diethylenetriaminepentaacetic acid-gadolinium salt (Gd-DTPA) aqueous solution. A three-dimensional (3D) partial flip-angle pulse sequence was used, providing a 1283 **array** of (46 microm)3 **isotropic voxels**. Fifty of the 128 axial images in the 3D data set comprising approximately 2.4 mm volume distal to the growth plate were processed from each specimen using a probability-based method for determining bone volume fraction (BVF), tubularity, contiguity, as well as the mean trabecular plate thickness and separation. PGE2 and alendronate altered BVF consistently at all tibial regions. The effect of alendronate was to keep BVF about midway between intact and OVX, whereas PGE2 returned BVF to intact levels. The other parameters showed similar responses to treatment. The strongest discriminator was trabecular BVF, which could obviously differentiate the groups. The study establishes NMRM as a nondestructive histomorphometric method for the quantitative evaluation of drug response in a rat ovariectomy model.

Tags: Comparative Study; Female; Support, Non-U.S. Gov't

29/9/2
DIALOG(R)File 155:MEDLINE(R)

13527978 PMID: 9214804
Unwrapping Cochlear implants by spiral CT.
Wang G; Vannier M W; Skinner M W; Kalender W A; Polacin A; Ketten D R
Mallinckrodt Institute of Radiology, Washington University School of Medicine, Saint Louis, MO 63110 USA. gwang@linda.wustl.edu
IEEE transactions on bio-medical engineering (UNITED STATES) Sep 1996, 43 (9) p891-900, ISSN 0018-9294 Journal Code: 0012737
Contract/Grant No.: RO1 DC 00581; DC; NIDCD; RO3 DC 02798; DC; NIDCD
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS
Multielectrode, intracochlear implants were designed for individuals with profound sensorineural hearing loss who derive little or no benefit form acoustic hearing aids. Determination of each electrode's position in a patient's inner ear may improve speech processor programming to maximize speech recognition. In this paper, an approach is described to use as input a volumetric spiral computed tomography (CT) image of the Nucleus electrode array (Cochlear Pty. Ltd, Lane Cove, NSW, Australia) to unwrap it, and to measure its implanted length given starting and end points. Representative curvilinear structures were digitally synthesized in image **volumes** of **isotropic** 0.1-mm **voxels**. The electrode **array** was spirally CT-scanned in vitro and in vivo, and reconstructed on an isotropic grid in 0.1-mm steps. Two algorithms were constructed to track and measure these curvilinear structures. The first algorithm is Karhunen-Loeve (K-L)-transform based, in which the K-L transform is locally applied at a current main axis position to determine the eigenvectors of the main axis **voxels** , the next main axis position is estimated from the current position along the principal eigendirection, adjusted to the mass center of the orthogonal cross section passing through the estimated position, and then scaled to have a prespecified step. The second algorithm is similar to the first one but avoids use of the K-L transform. In the second algorithm, the next position is directly estimated along the local direction and then processed with the same correction and scaling operations. With user-specified starting and end points as well as a local direction at the starting point, a curvilinear structure can be automatically tracked using either of the algorithms. The first algorithm is more robust, while the second one is more efficient. In the numerical and in vitro studies, the lengths of the curvilinear structures were accurately measured. Given local directions determined in the tracking process, an electrode array image can be unwrapped into a linear array with the central electrode axis as the abscissa. The unwrapping approach allows longitudinally and cross-sectionally accurate measurement and better visualization of cochlear implant images. With preimplantation knowledge of length, width, and center electrode distance, the position of individual electrodes can be estimated after unwrapping.
Tags: Human; Support, Non-U.S. Gov't; Support, U.S. Gov't, P.H.S.
Descriptors: *Cochlea--radiography--RA; *Cochlear Implants; *Tomography,

29/9/4
DIALOG(R)File 155:MEDLINE(R)

09821311 PMID: 7690447
Three-dimensional NMR microscopy of rat spleen and liver.
Zhou X; Magin R L; Alameda J C; Reynolds H A; Lauterbur P C
Biomedical Magnetic Resonance Laboratory, University of Illinois, Urbana-Champaign, Illinois.
Magnetic resonance in medicine - official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine (UNITED STATES) Jul 1993, 30 (1) p92-7, ISSN 0740-3194
Journal Code: 8505245
Contract/Grant No.: NCRR 1P41PR05964; RR; NCRR
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS
Three-dimensional microscopic NMR images of spleen and liver specimens from rats injected with dextran magnetite particles and from controls were obtained at 4.7 T, using a specially designed probe in conjunction with a 3D filtered back projection reconstruction algorithm. All of the images were reconstructed as 64(3) **arrays** with (25 microns) 3 **isotropic voxels** . With the aid of the MR contrast agent, the red pulp and marginal zone of the spleen and the portal triad of the liver could be distinguished from the surrounding tissue in T2-weighted images. For mature rat spleen, natural contrast in T2-weighted images was found to distinguish the same features. Histological examinations of the tissues with and without contrast agent were also performed using an optical microscope. Microscopic NMR images, despite their lower resolution, clearly revealed many features seen in the optical images.
Tags: Male; Support, Non-U.S. Gov't; Support, U.S. Gov't, Non-P.H.S.; Support, U.S. Gov't, P.H.S.
Descriptors: *Liver--anatomy and histology--AH; *Magnetic Resonance Imaging--methods--MT; *Spleen--anatomy and histology--AH; Aging; Animals;

36/9/14
DIALOG(R)File 2:INSPEC

5058290 INSPEC Abstract Number: A9520-8760K-032, B9511-7510B-050, C9511-7330-032
Title: Efficient 3D **grids** for **image** reconstruction using spherically-symmetric **volume elements**
Author(s): Matej, S.; Lewitt, R.M.
Author Affiliation: Dept. of Radiol., Pennsylvania Univ., Philadelphia, PA, USA
Conference Title: Nuclear Science Symposium and Medical Imaging Conference. 1994 IEEE Conference Record (Cat. No.94CH35762) Part vol.3 p.1177-81 vol.3
Publisher: IEEE, New York, NY, USA
Publication Date: 1995 Country of Publication: USA 4 vol. xl+1952 pp.
ISBN: 0 7803 2544 3
U.S. Copyright Clearance Center Code: 0 7803 2544 3/95/$4.00
Conference Title: Proceedings of 1994 IEEE Nuclear Science Symposium - NSS'94
Conference Date: 30 Oct.-5 Nov. 1994 Conference Location: Norfolk, VA, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Theoretical (T)
Abstract: Incorporation of spherically-symmetric **volume elements** (blobs), instead of the conventional **voxels**, into iterative **image** reconstruction algorithms, has been found in the authors' previous studies to lead to significant improvement in the quality of the reconstructed **images**. Furthermore, for 3D positron emission **tomography**, the 3D algebraic reconstruction technique using blobs can reach comparable or even better duality than the 3D filtered backprojection method after only one cycle through the projection data. The only shortcoming of the blob reconstruction is an increased computational demand, because of the overlapping nature of the blobs. These encouraging results mere obtained in the authors' previous studies for the case when the blobs were placed on the same 3D simple cubic **grid** used for **voxel** basis functions. For basis functions which are spherically-symmetric, there are more advantageous arrangements of the 3D grid, enabling a more **isotropic** distribution of the spherical functions in the 3D space and a, better packing efficiency of the **image** spectrum. A good arrangement is the body centered cubic grid. The authors' studies confirmed that, when using this type of 3D grid, the number of grid points can be effectively reduced, decreasing the computational and memory demands while preserving the quality of the reconstructed **images**. (16 Refs)
Subfile: A B C
Descriptors: **image** reconstruction; medical **image** processing; positron emission **tomography**

36/9/15
DIALOG(R)File 2:INSPEC

5053471 INSPEC Abstract Number: A9520-8760K-020, B9511-7510B-029, C9511-5260B-016

Title: Efficient 3D **grids** for **image** reconstruction using spherically-symmetric **volume elements**

Author(s): Matej, S.; Lewitt, R.M.

Author Affiliation: Dept. of Radiol., Pennsylvania Univ., Philadelphia, PA, USA

Journal: IEEE Transactions on Nuclear Science Conference Title: IEEE Trans. Nucl. Sci. (USA) vol.42, no.4, pt.1 p.1361-70

Publication Date: Aug. 1995 Country of Publication: USA

CODEN: IETNAE ISSN: 0018-9499

U.S. Copyright Clearance Center Code: 0018-9499/95/$4.00

Conference Title: 1994 Nuclear Science Symposium and Medical Imaging Conference, NSS/MIC

Conference Date: 30 Oct.-5 Nov. 1994 Conference Location: Norfolk, VA, USA

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Practical (P); Theoretical (T)

Abstract: Incorporation of spherically-symmetric **volume elements** (blobs), instead of the conventional **voxels**, into iterative **image** reconstruction algorithms, has been found in our previous studies to lead to significant improvement in the quality of the reconstructed **images** . Furthermore, for three-dimensional (3D) positron emission **tomography** the 3D algebraic reconstruction technique using blobs can reach comparable or even better quality than the 3D filtered backprojection method after only one cycle through the projection data. The only shortcoming of the blob reconstruction method is an increased computational demand, because of the overlapping nature of the blobs. In our previous studies the blobs were placed on the same 3D simple cubic **grid** as used for **voxel** basis functions. For spherically-symmetric basis functions there are more advantageous arrangements of the 3D grid, enabling a more **isotropic** distribution of the spherical functions in the 3D space and a better packing efficiency of the **image** spectrum. Our studies confirmed that, when using the body centered cubic grid, the number of grid points can be effectively reduced, decreasing the computational and memory demands while preserving the quality of the reconstructed **images**. (21 Refs)

Subfile: A B C

Descriptors: **image** reconstruction; positron emission **tomography**

Identifiers: efficient 3D grids; **image** reconstruction;

36/9/16
DIALOG(R)File 2:INSPEC

5027639 INSPEC Abstract Number: A9518-8760B-027, B9510-7510B-065, C9510-7330-063

Title: Modeling, measurement and correction of wavefront distortion produced by breast specimens

Author(s): Qing Zhu; Steiberg, B.D.

Author Affiliation: Valley Forge Res. Center, Pennsylvania Univ., Philadelphia, PA, USA

Conference Title: 1994 IEEE Ultrasonics Symposium. Proceedings (Cat. No.94CH3468-6) Part vol.3 p.1613-17 vol.3

Editor(s): Levy, M.; Schneider, S.C.; McAvoy, B.R.

Publisher: IEEE, New York, NY, USA

Publication Date: 1994 Country of Publication: USA 3 vol. 1911 pp.

ISBN: 0 7803 2012 3

U.S. Copyright Clearance Center Code: 1051-0117/94/0000-1613$4.00

Conference Title: Proceedings of IEEE Ultrasonics Symposium

Conference Sponsor: IEEE Ultrasonics, Ferroelectr. & Frequency Control Soc

Conference Date: 1-4 Nov. 1994 Conference Location: Cannes, France

Language: English Document Type: Conference Paper (PA)

Treatment: Practical (P); Theoretical (T); Experimental (X)

Abstract: Wavefront compensation algorithms can improve **contrast resolution** by folding ultrasonic scattered energy into the coherent field. Experiments reported in this paper show that **contrast resolution** can be restored up to -16.8 dB on average by using phase deaberration algorithms alone. Further improvement of **contrast resolution** requires compensation algorithms that can take refraction and strong scattering into account. Because refraction is not a stationary, stochastic process, there are two tasks required for removing its energy. The first is the recognition of which lobes of bundles of arriving energy are associated with simple scattering and which are not. Since the distribution of coherent interference energy is nonisotropic, geometric techniques may separate them from **isotropic** scattered energy. The technique we are experimenting with is spatial location diversity. We are able to identify **image** artifacts from the **image** lobe. The second is the removal of the refracted energy. We are currently pursuing the second task. (12 Refs)

Subfile: A B C

Descriptors: acoustic **correlation**; bioacoustics; biomedical ultrasonics; **image resolution**; medical **image** processing; ultrasonic refraction; ultrasonic scattering

Identifiers: wavefront distortion; breast specimens; wavefront compensation algorithms; **contrast resolution**; ultrasonic scattered energy; coherent field; phase deaberration algorithms; refraction ; strong scattering; coherent interference energy; geometric techniques; **isotropic** scattered energy; spatial location diversity; **image** artifacts; **image** lobe; refracted energy; ultrasound wave

36/9/3
DIALOG(R)File 2:INSPEC

6513324 INSPEC Abstract Number: A2000-07-8770E-024, B2000-04-7510N-021, C2000-04-7330-136

Title: Quantitative functional MRI of the visual cortex as a function of luminance contrast at 1.5 T

Author(s): Faro, S.H.; Mohamed, F.B.; Tracy, J.I.; Pinus, A.; Lublin, F.; Elfont, R.; Koenigsberg, R.; Tsai, F.Y.

Author Affiliation: MCP Hahnemann Univ., Philadelphia, PA, USA

Conference Title: Proceedings of the First Joint BMES/EMBS Conference. 1999 IEEE Engineering in Medicine and Biology 21st Annual Conference and the 1999 Annual Fall Meeting of the Biomedical Engineering Society (Cat. No.99CH37015) Part vol.2 p.1082 vol.2

Publisher: IEEE, Piscataway, NJ, USA

Publication Date: 1999 Country of Publication: USA 2 vol. vi+1345 pp.

ISBN: 0 7803 5674 8 Material Identity Number: XX-1999-03138

U.S. Copyright Clearance Center Code: 0 7803 5674 8/99/$10.00

Conference Title: Proceedings of the First Joint BMES/EMBS Conference

Conference Sponsor: Medtronic; Johnson & Johnson; Baxter Cardio Vascular Group; Becton Dickinson & Co.; Georgia Biomed. Partnership; Guidant Found.; Kilpatrick Stockton LLP; King & Spaulding; Troutman Sanders LLP; Adv. Tissue Sci.; AVL Biosense Corp.; CUH2A; Ernst & Young LLP; State of Georgia ; Dept. Ind.; Trade & Tourism; Healthdyne Companies; Long Aldrige & Norman; Porex Corp.; Sulzer Innotec; Turner Constr. Company

Conference Date: 13-16 Oct. 1999 Conference Location: Atlanta, GA, USA

Language: English Document Type: Conference Paper (PA)

Treatment: Theoretical (T); Experimental (X)

Abstract: Examined the BOLD signal changes in primary visual cortex as a function of luminous contrast at 1.5 T in 4 normals and 2 patients with multiple sclerosis (MS) disease. Echo planar T2* weighted BOLD **imaging** experiments were performed using a 1.5 T **Imager**. Ten axial slices through the calcarine fissure were obtained. The **imaging** series consisted of alternations between a 20-second epoch of dark screen (rest) and a 20-second epoch of a flickering checkerboard (activation) repeated 6 times. Each **imaging** series utilized a **stepwise**, graded increase of eight different luminance contrast levels. A paired t-test was used to compare the control condition with each activation condition. The data shows a linear trend in the number of fMRI activated **voxels** within the visual cortex with increasing luminous contrast in normals and MS patients. This study demonstrates quantifiable changes in BOLD signal and a linear increase in activated **voxels** within the primary visual cortex with increasing luminous contrast. (0 Refs)

Subfile: A B C

Descriptors: biomedical MRI; brain; diseases; medical **image** processing; vision defects

Identifiers: blood oxygenation level dependant signal changes; primary visual cortex; luminous contrast; normals; multiple sclerosis disease; echo planar T2* weighted BOLD **imaging** experiments; axial slices; calcarine fissure; **imaging** series; dark screen; rest; flickering checkerboard; functional magnetic resonance **imaging** activated **voxels**; luminance contrast levels; paired t-test; control condition; activation condition; multiple sclerosis patients

36/9/4
DIALOG(R)File 2:INSPEC

6410269 INSPEC Abstract Number: A2000-01-4725F-002
Title: Pattern recognition analysis of the turbulent flow past a backward facing step
Author(s): Scarano, F.; Benocci, C.; Riethmuller, M.L.
Author Affiliation: Dept. of Environ. & Appl. Fluid Mech., Inst. for Fluid Dynamics, Belgium
Journal: Physics of Fluids vol.11, no.12 p.3808-18
Publisher: AIP,
Publication Date: Dec. 1999 Country of Publication: USA
CODEN: PHFLE6 ISSN: 1070-6631
SICI: 1070-6631(199912)11:12L.3808:PRAT;1-U
Material Identity Number: B479-1999-011
U.S. Copyright Clearance Center Code: 1070-6631/99/11(12)/3808(11)/$15.00
Document Number: S1070-6631(99)00512-7
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T); Experimental (X)
Abstract: A pattern recognition technique for the investigation of large-scale coherent structures, is applied to analyze the turbulent separated flow over a backward facing step (BFS) at a Reynolds number Re/sub h/=5.0*10/sup 3/. The instantaneous two-dimensional velocity distribution is obtained by means of digital particle **image** velocimetry (D-PIV) measurements. High spatial **resolution** (Delta r/h=1/25) is achieved with the application of an iterative window refinement **image** processing algorithm. The measurement **plane** is oriented in order to investigate spanwise aligned vortices footprints. The detection algorithm is based on velocity pattern spatial cross **correlation**. An additional **isotropy** condition is imposed to improve the detection of vortices and shear layer. The structure of the shear layer emanating from the step edge is examined emphasizing the role of coherent fluctuations with a length scale d ranging from 0.12 h to 0.44 h. A characteristic statistical spatial occurrence is found for the educed spanwise-aligned rollers: a quasi-linear spreading region extends from x/h=0.8 up to x/h=3.5. Within the same region the production of turbulent kinetic energy exhibits a maximum. At smaller scale, the vortices show a significant presence of counter-rotating structures inside the free shear layer suggesting that the spanwise rollers undergo early three dimensional instability and breakdown within a few step units. Conditional data averaging is also applied to the results and structural properties (coherent velocity, vorticity and turbulence production) are highlighted: close to the step edge the coherent vorticity distribution is strongly distorted showing an intense interaction between the rollers and the shear layer. A roughly circular pattern is recovered downstream x/h=4. (20 Refs)
Subfile: A
Descriptors: flow instability; flow measurement; flow separation; fluctuations; pattern recognition; shear turbulence; vortices
Identifiers: pattern recognition analysis; turbulent flow; backward facing step; large-scale coherent structures; turbulent separated flow; instantaneous two-dimensional velocity distribution; digital particle **image** velocimetry; iterative window refinement **image** processing algorithm; spanwise aligned vortices; **isotropy** condition; shear layer ; coherent fluctuations; characteristic statistical spatial occurrence;

36/9/6
DIALOG(R)File 2:INSPEC

6232042 INSPEC Abstract Number: B1999-06-6135-020, C1999-06-5260B-025
Title: Parameter estimation and denoising of 2-D noisy fractional Brownian motion using non-**orthogonal** wavelets
Author(s): Jen-Chang Liu; Hwang, W.L.
Author Affiliation: Inst. of Inf. Sci., Acad. Sinica, Taipei, Taiwan
Conference Title: Proceedings of the IEEE-SP International Symposium on Time-Frequency and Time-Scale Analysis (Cat. No.98TH8380) p.129-32
Publisher: IEEE, New York, NY, USA
Publication Date: 1998 Country of Publication: USA xiv+676 pp.
ISBN: 0 7803 5073 1 Material Identity Number: XX-1998-01748
U.S. Copyright Clearance Center Code: 0 7803 5073 1/98/$10.00
Conference Title: Proceedings of International Symposium on Time-Frequency and Time-Scale Analysis
Conference Sponsor: IEEE Signal Process. Soc
Conference Date: 6-9 Oct. 1998 Conference Location: Pittsburgh, PA, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Theoretical (T); Experimental (X)
Abstract: Fractional Brownian motion (fBm) is a non-stationary stochastic model, which has a 1/f spectrum and statistical self-similar property. We extend the proposed methods of Hwang to an **isotropic** 2-D noisy fBm **image** . The extension is not straightforward; although one can obtain the fractal parameter of an **isotropic** fBm by averaging of the estimated fractal parameters from several directions by means of the 1-D fractal parameter estimation algorithm, this approach does not perform well in practice. It was shown by Hwang that it requires more than 1000 sampled points for a robust 1-D fractal parameter estimation. For a median size **image** (say with size 256 by 256 or smaller), there is not enough pixels at each direction for a robust 1-D fractal parameter estimation. Thus, alternative methods must be developed in order that the robustness fractal estimation from a noisy fBm **image** with small size can be achieved. In this paper, we show that the wavelet transform of an **isotropic** fBm **image** at each scale is a two-dimensional weakly stationary process at both the horizontal and vertical directions. Thus, robust fractal parameter estimation can be obtained from two-dimensional wavelet coefficients, even for a small noisy fBm **image**. We propose a fractal parameter estimation algorithm which formulates the robust fractal parameter estimation problem as the characterization of a composite singularity from the autocorrelation of wavelet transforms of a noisy fBm **image**. (12 Refs)
Subfile: B C
Descriptors: Brownian motion; **correlation** methods; fractals; **image** motion analysis; parameter estimation; stochastic processes;

36/9/8
DIALOG(R)File 2:INSPEC

5986886 INSPEC Abstract Number: A9818-8760J-006, B9809-7510B-108, C9809-7330-155
Title: Spiral CT **image** deblurring for cochlear implantation
Author(s): Ge Wang; Vannier, M.W.; Skinner, M.W.; Cavalcanti, M.G.P.; Harding, G.W.
Author Affiliation: Dept. of Radiol., Iowa Univ., Iowa City, IA, USA
Journal: IEEE Transactions on Medical Imaging vol.17, no.2 p.251-62
Publisher: IEEE,
Publication Date: April 1998 Country of Publication: USA
CODEN: ITMID4 ISSN: 0278-0062
SICI: 0278-0062(199804)17:2L.251:SIDC;1-D
Material Identity Number: C904-98003
U.S. Copyright Clearance Center Code: 0278-0062/98/$10.00
Document Number: S0278-0062(98)04994-5
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Cochlear implantation is the standard treatment for profound hearing loss, Preimplantation and postimplantation spiral computed **tomography** (CT) is essential in several key clinical and research aspects. The maximum **image** resolution with commercial spiral CT scanners is insufficient to define clearly anatomical features and implant electrode positions in the inner ear, In this paper, the authors develop an expectation maximization (EM)-like iterative deblurring algorithm to achieve spiral CT **image** super-resolution for cochlear implantation, assuming a spatially invariant linear spiral CT system with a three-dimensional (3-D) separable Gaussian point spread function (PSF). The authors experimentally validate the 3-D Gaussian blurring model via phantom measurement and profile fitting. The **imaging** process is further expressed as convolution of an **isotropic** 3-D Gaussian PSF and a blurred underlying volumetric **image**. Under practical conditions, an oblique reconstructed section is approximated as convolution of an **isotropic** two dimensional (2-D) Gaussian PSF and the corresponding actual cross section. The spiral CT **image** deblurring algorithm is formulated with sieve and resolution kernels for suppressing noise and edge artifacts. A typical cochlear cross section is used for evaluation, demonstrating a resolution gain up to 30%-40% according to the **correlation** criterion. Physical phantoms, preimplantation and postimplantation patients are reconstructed into volumes of 0.1-mm cubic **voxels**. The patient **images** are digitally unwrapped along the central axis of the cochlea and the implanted electrode array respectively, then oblique sections **orthogonal** to the central axis formed. After deblurring, representation of structural features is substantially improved in all the cases. (31 Refs)
Subfile: A B C
Descriptors: computerised **tomography**; hearing aids; **image** resolution; iterative methods; medical **image** processing; prosthetics

36/9/9
DIALOG(R)File 2:INSPEC

5917683 INSPEC Abstract Number: A9812-8770G-001, B9806-7520-014, C9806-7330-309

Title: Evolution-based methods for selecting point data for object localization: applications to computer-assisted surgery

Author(s): Baluja, S.; Simon, D.

Author Affiliation: Justsystem Pittsburgh Res. Centre, Pittsburgh, PA, USA

Journal: Applied Intelligence: The International Journal of Artificial Intelligence, Neural Networks, and Complex Problem-Solving Technologies vol.8, no.1 p.7-19

Publisher: Kluwer Academic Publishers,

Publication Date: Jan.-Feb. 1998 Country of Publication: Netherlands

CODEN: APITE4 ISSN: 0924-669X

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Material Identity Number: O515-98001

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Language: English Document Type: Journal Paper (JP)

Treatment: Applications (A); Practical (P); Theoretical (T)

Abstract: Object localization has applications in many areas of engineering and science. The goal is to spatially locate an arbitrarily shaped object. In many applications, it is desirable to minimize the number of measurements collected while ensuring sufficient localization accuracy. In surgery, for example, collecting a large number of localization measurements may either extend the time required to perform a surgical procedure or increase the radiation dosage to which a patient is exposed. Localization accuracy is a function of the spatial distribution of discrete measurements over an object when measurement noise is present. In previous work (Simon et al., 1995), metrics were presented to evaluate the information available from a set of discrete object measurements. In this study, new approaches to the discrete point data selection problem are described. These include **hillclimbing**, genetic algorithms (GAs), and population-based incremental learning (PBIL). Extensions of the standard GA and PBIL methods that employ multiple parallel populations are explored. The results of extensive empirical testing are provided. The results suggest that a combination of PBIL and **hillclimbing** result in the best overall performance. A computer-assisted surgical system that incorporates some of the methods presented in this paper is currently being evaluated in cadaver trials. (26 Refs)

Subfile: A B C

Descriptors: genetic algorithms; **image** registration; learning (artificial intelligence); minimisation; search problems; surgery

36/9/11
DIALOG(R)File 2:INSPEC

5371715 INSPEC Abstract Number: A9620-8734-018, B9610-7520E-003, C9610-7330-292
Title: Unwrapping cochlear implants by spiral CT
Author(s): Ge Wang; Vannier, M.W.; Skinner, M.W.; Kalender, W.A.; Polacin, A.; Ketten, D.R.
Author Affiliation: Mallinckrodt Inst. of Radiol., Washington Univ. Sch. of Med., St. Louis, MO, USA
Journal: IEEE Transactions on Biomedical Engineering vol.43, no.9 p.891-900
Publisher: IEEE,
Publication Date: Sept. 1996 Country of Publication: USA
CODEN: IEBEAX ISSN: 0018-9294
SICI: 0018-9294(199609)43:9L.891:UCIS;1-M
Material Identity Number: I050-96009
U.S. Copyright Clearance Center Code: 0018-9294/96/$05.00
Document Number: S0018-9294(96)06105-8
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: Multielectrode, intracochlear implants were designed for individuals with profound sensorineural hearing loss who derive little or no benefit from acoustic hearing aids. Determination of each electrode's position in a patient's inner ear may improve speech processor programming to maximize speech recognition. In this paper, an approach is described to use as input a volumetric spiral computed **tomography** (CT) **image** of the Nucleus electrode array (Cochlear Pty. Ltd, Lane Cove, NSW, Australia) to unwrap it, and to measure its implanted length given starting and end points. Representative curvilinear structures were digitally synthesized in **image** volumes of **isotropic** 0.1-mm **voxels**. The electrode **array** was spirally CT-scanned in vitro and in vivo, and reconstructed on an **isotropic** grid in 0.1-mm steps. Two algorithms were constructed to track and measure these curvilinear structures. The first algorithm is Karhunen-Loeve (K-L)-transform based, in which the K-L transform is locally applied at a current main aids position to determine the eigenvectors of the main axis **voxels**, the next main axis position is estimated from the current position along the principal eigendirection, adjusted to the mass center of the orthogonal cross section passing through the estimated position, and then scaled to have a prespecified step. The second algorithm is similar to the first one but avoids use of the K-L transform, in the second algorithm, the next position is directly estimated along the local direction and then processed with the same correction and scaling operations. With user-specified starting and end points as well. As a local direction at the starting point, a curvilinear structure can be automatically tracked using either of the algorithms. The first algorithm is more robust, while the second one is more efficient. In the numerical and in vitro studies, the lengths of the curvilinear structures were accurately measured. Given local directions determined in the tracking process, an electrode array **image** can be unwrapped into a linear array with the central electrode axis as the abscissa. The unwrapping approach allows longitudinally and cross-sectionally accurate measurement and better visualization of cochlear implant **images** . With preimplantation knowledge of length, width, and center electrode distance, the position of individual electrodes can be estimated after unwrapping. (28 Refs)
Subfile: A B C
Descriptors: computerised **tomography**; ear; hearing aids; medical **image** processing; transforms

36/9/12
DIALOG(R)File 2:INSPEC

5302740 INSPEC Abstract Number: C9608-7330-020
Title: Reconstruction of branching blood vessels from CT-data
Author(s): Zahlten, C.; Jurgens, I.; Peitgen, H.-O.
Author Affiliation: Center for Complex Syst. & Visualization, Bremen Univ., Germany
Conference Title: Visualization in Scientific Computing p.41-52
Editor(s): Gobel, M.; Muller, H.; Urban, B.
Publisher: Springer-Verlag, Wien, Austria
Publication Date: 1995 Country of Publication: Austria viii+238 pp.
ISBN: 3 211 82633 5 Material Identity Number: XX95-00460
Conference Title: Proceedings Fifth Eurographics Workshop on Visualization in Scientific Computing
Conference Date: 30 May-1 June 1994 Conference Location: Rostock, Germany
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P)
Abstract: A method is proposed to extract tree-like objects from sliced three dimensional data sets and to model their bifurcation structure and hierarchy. Starting from a seed **voxel**, the algorithm expands **stepwise** within the object and aligns the direction of each step with the local direction of the tree. Bifurcations are recognized from the increasing number of connected components found per step. While traversing the structure of interest, a symbolic tree is generated which corresponds to the **voxel** -based reconstruction and which serves for interactive identification of sub-branches, their selection and specific coloring. (11 Refs)
Subfile: C
Descriptors: bifurcation; computerised **tomography**; data visualisation; haemodynamics; **image** recognition; **image** reconstruction; medical **image** processing
Identifiers: branching blood vessel reconstruction; CT-data; computerised **tomography**; tree-like object extraction; sliced three dimensional data sets; 3D data sets; bifurcation; seed **voxel**; symbolic tree; **voxel**-based reconstruction; interactive identification; coloring; **image** analysis; data visualization

36/9/18
DIALOG(R)File 2:INSPEC

4762415 INSPEC Abstract Number: A9420-8780-027
Title: Studies on bromobenzene-induced hepatotoxicity using in vivo MR **microscopy** with surgically implanted RF coils
Author(s): Xiaohong Zhou; Maronpot, R.R.; Cofer, G.P.; Hedlund, L.W.; Johnson, G.A.
Author Affiliation: Dept. of Radiol., Duke Univ. Med. Center, Durham, NC, USA
Journal: Magnetic Resonance in Medicine vol.31, no.6 p.619-27
Publication Date: June 1994 Country of Publication: USA
CODEN: MRMEEN ISSN: 0740-3194
U.S. Copyright Clearance Center Code: 0740-3194/94/$3.00
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
Abstract: Using surgically implanted RF coils at 300 MHz, three-dimensional microscopic MR **images** of rat liver were obtained in vivo to follow the devolvement of pathology induced by bromobenzene exposure. Formalin fixed specimens of liver from these animals were also **imaged** using in vitro MR **microscopy**, followed by conventional optical **microscopy**. All MR **images** were acquired using a spin-warp pulse sequence with TR=950 ms and TE=23 ms. The in vivo **images** were reconstructed as 256/sup 2/*32 **arrays** with a **voxel** size of (50 mu m)/sup 2/*219 mu m, while the in vitro **images** were reconstructed as 256/sup 2/*128 arrays, giving an **isotropic resolution** at (39 mu m)/sup 3/. Based on results from six animals, the authors have found in all animals exposed to bromobenzene, **image** intensity decreased in specific hepatic tissue regions. These regions were well **correlated** to low signal intensity areas observed in in vitro MR **images** at higher **resolution**. Conventional optical **microscopy** indicated that the low signal intensity regions corresponded to areas of necrosis. The decrease in signal intensity is consistent with increased local diffusion coefficients as a result of necrosis. This study demonstrates that MR **microscopy** with implanted RF coils can be successfully used to follow tissue pathological changes in living tissues. (37 Refs)
Subfile: A
Descriptors: biological NMR; liver; **microscopy**; organic compounds
Identifiers: bromobenzene-induced hepatotoxicity; in vivo MR

36/9/20
DIALOG(R)File 2:INSPEC

03922831 INSPEC Abstract Number: C91048198
Title: 3D **image** synthesis for B-reps objects
Author(s): Huang Zhengdong; Peng Qunsheng; Liang Youdong
Author Affiliation: CAD/CAM Center, Zhejiang Univ., Hangzhou, China
Journal: Journal of Computer Science and Technology (English Language Edition) vol.6, no.2 p.113-20
Publication Date: April 1991 Country of Publication: China
CODEN: JCTEEM ISSN: 1000-9000
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: The paper presents an algorithm for generating 3D **images** of B-reps objects with trimmed surface boundaries. The 3D **image** is a discrete **voxel**-map representation within a cubic frame buffer (CFB). The definition of 3D **images** for curve, surface and solid object are introduced which imply the connectivity and fidelity requirements. Adaptive forward differencing matrix (AFD-matrix) for 1D-3D manifolds in 3D space is developed. By setting rules to update the AFD-matrix, the forward difference direction and **stepwise** can be adjusted. Finally, an efficient algorithm is presented based on the AFD-matrix concept for converting the object in 3D space to 3D **image** in 3D discrete space.
(11 Refs)
Subfile: C
Descriptors: solid modelling
Identifiers: adaptive forward difference matrix; solid modelling; 3D **images**; B-reps objects; trimmed surface boundaries; discrete **voxel**-map representation; cubic frame buffer; curve; surface; solid

36/9/21
DIALOG(R)File 2:INSPEC

03830330 INSPEC Abstract Number: A91036188
Title: **Scanning** tunneling **microscopy** observations on the reconstructed Au(111) surface: atomic structure, long-range superstructure, rotational domains, and surface defects
Author(s): Barth, J.V.; Brune, H.; Ertl, G.; Behm, R.J.
Author Affiliation: Fritz-Haber-Inst. der Max-Planck-Gesellschaft, Berlin, West Germany
Journal: Physical Review B (Condensed Matter) vol.42, no.15 p. 9307-18
Publication Date: 15 Nov. 1990 Country of Publication: USA
CODEN: PRBMDO ISSN: 0163-1829
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
Abstract: High-**resolution scanning** tunneling **microscopy** data on the reconstructed Au(111) surface are presented that give a comprehensive picture of the atomic structure, the long-range ordering, and the interaction between reconstruction and surface defects in the reconstructed surface. On the basis of the atomically **resolved** structure, the stacking-fault-domain model involving periodic transitions from FCC to HCP stacking of top-layer atoms is confirmed. The practically uniform contraction in the surface layer along (110) indicates that the previously proposed silicon functionalisms are not correct descriptions for the FCC to HCP stacking transition. The lateral displacement of approximately 0.9 AA in the (/sub -1//sup 22/ /sub 2//sup 0/) unit cell along (112) is in good agreement with the transition between FCC and HCP stacking. The vertical displacement in the transition regions (0.20+or-0.05 AA) is largely independent of the tunneling parameters, while the atomic corrugation (0.2 AA typically, up to 1 AA) depends strongly on tunneling parameters and tip conditions. The two different stacking regions within the unit cell are directly identified from the domain pattern at step edges; FCC stacking is deduced for the wider areas and thus is energetically more favorable. A new long-range superstructure is reported. It is created by a **correlated** periodic bending of the parallel corrugation lines by +or-120 degrees every 250 AA, i.e. rotational domains are arranged in a zigzag pattern. Interactions on this scale indicate long-range elastic lattice strain. This structure reflects the overall tendency to **isotropic** contraction, combining the locally favorable uniaxial contraction and an effective **isotropic** contraction on a larger scale. Boundaries of rotational domains can also be formed by a termination of the reconstruction lines. Individual corrugation lines, separating different stacking regions, cannot disappear. The termination occurs in well-ordered, U-shaped connections of neighbored lines or by a complicated pattern of entangled corrugation lines. Steps and bulk defects do not inhibit the reconstruction, but can affect the local reconstruction pattern. In most cases steps are crossed by the reconstruction lines, and the strict **correlation** of the reconstruction pattern on the terraces, both in phase and orientation, reflects interaction over the step edge. Sometimes the reconstruction pattern at the steps resembles those found at rotational domain boundaries. (43 Refs)
Subfile: A
Descriptors: crystal atomic structure of elements; domain boundaries; elastic deformation; gold; **scanning** tunnelling **microscopy**; stacking faults; surface phase transformations; surface structure; Wigner crystal

36/9/22
DIALOG(R)File 2:INSPEC

03741364 INSPEC Abstract Number: A90138697
Title: Three-dimensional **imaging** system based on Fourier transform synthetic aperture focusing technique
Author(s): Mayer, K.; Marklein, R.; Langenberg, K.J.; Kreutter, T.
Author Affiliation: Dept. of Electr. Eng., Kassel Univ., West Germany
Journal: Ultrasonics vol.28, no.4 p.241-55
Publication Date: July 1990 Country of Publication: UK
CODEN: ULTRA3 ISSN: 0041-624X
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P); Theoretical (T)
Abstract: For planar scan surfaces, digitized ultrasonic RF-data can be adequately processed in terms of the Fourier transform synthetic aperture focusing technique algorithm, i.e. in terms of synthetic aperture pulse-echo backpropagation utilizing Fourier transforms only, to yield a quantitative three-dimensional **image** of defects residing in the homogeneous and **isotropic** bulk material. The implementation of this algorithm into an ultrasonic **imaging** system is described, which mainly comprises an array processor and high-resolution graphics to display the three-dimensional reconstruction volume as a walk-through along three **orthogonal** planes. To enhance the signal-to-noise ratio and the axial resolution of the system, controlled ultrasonic signals are transmitted as complementary Golay-sequences, cross-**correlated** with the received signals and deconvolved with similarly obtained reference signals. (25 Refs)
Subfile: A
Descriptors: **acoustic imaging; acoustic signal processing;** Fourier transforms; ultrasonic materials testing

36/9/23
DIALOG(R)File 2:INSPEC

03584296 INSPEC Abstract Number: B90023771
Title: An **image** data compression method using extrapolative prediction-discrete sine transform; in the case of two-dimensional coding
Author(s): Yamane, N.; Morikawa, Y.; Hamada, H.
Author Affiliation: Sch. of Eng., Okayama Univ., Japan
Journal: Electronics and Communications in Japan, Part 1 (Communications) vol.72, no.6 p.84-93
Publication Date: June 1989 Country of Publication: USA
CODEN: ECJCED ISSN: 8756-6621
U.S. Copyright Clearance Center Code: 8756-6621/89/0006-0084$7.50/0
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Considers the highly efficient coding of the gray-level **image**. The extrapolative prediction-discrete sine transform scheme is extended to the case of two-dimensional coding. In the proposed method, the **image** is partitioned into square blocks. The **correlations** among blocks are eliminated by applying the two-dimensional extrapolative prediction for each block from the restored boundary pixel. The **correlation** in the block is eliminated by applying the **orthogonal** transformation to the prediction errors. The **correlation** function of the **image** is assumed as the **isotropic** exponential function, and a two-dimensional extrapolative prediction method is derived, which can be realized as a simple manipulation. The transformation of the prediction errors is performed by the variable-separation type two-dimensional extrapolative prediction-discrete sine transform, where the one-dimensional extrapolative prediction-discrete sine transform is applied to rows and columns. (5 Refs)
Subfile: B
Descriptors: data compression; encoding; picture processing; transforms
Identifiers: rate distortion characteristic; computer simulation;

36/9/24
DIALOG(R)File 2:INSPEC

03493140 INSPEC Abstract Number: A89134908
Title: A study of the structure of Lomer and 60 degrees dislocations in aluminium using high-**resolution** transmission electron **microscopy**
Author(s): Mills, M.J.; Stadelmann, P.
Author Affiliation: Ecole Polytech. Federale, Lausanne, Switzerland
Journal: Philosophical Magazine A (Physics of Condensed Matter, Defects and Mechanical Properties) vol.60, no.3 p.355-84
Publication Date: Sept. 1989 Country of Publication: UK
CODEN: PMAADG ISSN: 0141-8610
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
Abstract: The structure of asymmetric (110) tilt boundaries developed during creep of pure aluminium single crystals is studied using high-**resolution** electron **microscopy** . The small- and moderate-misorientation boundaries are composed of Lomer and 60 degrees dislocations. Extensive **image** simulation is used to deduce the detailed core structures of these two dislocations. Comparisons with calculated elastic displacements indicate that the Lomer dislocation is not detectably dissociated in its (001) glide **plane**, or into the sessile Lomer-Cottrell configuration. The agreement between the observed atomic column positions and continuum elasticity is excellent, except for the innermost positions near the core of the Lomer dislocation. The core structure of these discrete Lomer dislocations also **correlates** well with previous atomistic calculations for a larger-misorientation Sigma =19 boundary. A similar analysis of the displacements around 60 degrees dislocations using **isotropic** elasticity indicates a slight dissociation of about 0.55+or-0.15 nm on the (111). The lateral migration of boundaries in the thin transmission electron **microscopy** foils is also observed to occur by the motion of 60 degrees dislocations within the boundary **plane** via a reversible Lomer reaction. The observation of an alternate core structure for the Lomer dislocation during this migration process is explained by the presence of a kink along the dislocation line. Multislice **image** simulations in which the structure varies with depth are used to study the effects of kinks and dislocation inclination on core structure **images** in thin foils. The implications of these observations in terms of dislocation glide on (001) in aluminium are discussed. (45 Refs)
Subfile: A
Descriptors: aluminium; creep; dislocation structure; elastic deformation ; slip; tilt boundaries; transmission electron microscope examination of materials
Identifiers: multislice **image** simulations; high-**resolution**

36/9/25
DIALOG(R)File 2:INSPEC

02958535 INSPEC Abstract Number: A87107196, C87055605
Title: Rapid three-dimensional angiography with undersampled MR **imaging**
Author(s): Wedeen, V.J.; Yong Sheng Chao
Author Affiliation: Dept. of Radiol., Massachusetts Gen. Hospital, Boston, MA, USA
Journal: Journal of Computer Assisted Tomography vol.11, no.1 p. 24-30
Publication Date: Jan.-Feb. 1987 Country of Publication: USA
CODEN: JCATD5 ISSN: 0363-8715
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T); Experimental (X)
Abstract: Techniques for subtraction angiography with magnetic resonance **imaging** have been extended from two to three dimensions, and a method that reduces the expected data acquisition time by at least an order of magnitude is presented. Electrocardiogram-gated three-dimensional (3D) **images** are acquired by Fourier transform technique and flow contrast is obtained by subtracting pairs of **images** acquired at different points in the cardiac cycle. The vascular tree is shown in 3D perspective by means of a surface detection and a 3D display program. **Isotropic** 3D angiography requires determining the disposition of the blood vessels in a **matrix** of cubic **voxels** . Using orthodox Fourier transform technique, for an **image matrix** with 256 **voxels** to the edge, a data acquisition with 256*256=65 K phase-encodings would be needed. If gated, this would require approximately 1 day. The authors abbreviate the data acquisition by doing only 1/64 of the usual set of phase-encoding gradient pulses. Spatial resolution is undiminished, but aliasing or 'wraparound' results in each of the two phase-encoded coordinates of the 3D **image**. Studies of the abdominal aorta are presented. (12 Refs)
Subfile: A C
Descriptors: biomedical NMR; cardiology; computerised **tomography**; diagnostic radiography; haemodynamics
Identifiers: electrocardiogram-gated 3D **images**; three-dimensional angiography; undersampled MR **imaging**; subtraction angiography;